Assessment of the potential of chemokines as a biomarker for infertility and oocyte maturity in Assisted Reproductive Technology

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Abstract

Background: chemokines are a family of immune system cytokines that have an important role in the reproduction system. They uptake and activate the neutrophils in the human preovulatory follicle. This study examined the expression of the CCL2, CCL3, and CXCL8 chemokines in the serum, follicular fluid (FF), and cumulus cells (CCs), as well as their relationship with oocyte maturation in women undergoing intracytoplasmic sperm injection (ICSI).

Methods: The study group consisted of 200 women undergoing the ICSI cycle who were divided into fertile women with male factor infertility (control) and women with female factor infertility (experimental). The expression of proteins and mRNA of CCL2, CCL3, and CXCL8 chemokines were evaluated in serum, FF, and CCs using enzyme-linked immunosorbent assay method (ELISA), and Real-Time PCR, respectively. The count of oocytes obtained, MII oocytes, and the percentage of oocyte maturity were evaluated in every woman in two groups. Additionally, the correlation between chemokine protein and mRNA expression was examined with oocyte maturation.

Discussion and results: The level of protein and mRNA of CCL2 expression in the FF and serum, CXCL8 expression in the serum, FF, and CCs, and the expression of CCL3 in the FF were significantly higher in the experimental group than in the control group($p<0.05$). The CCL2 and CXCL8 expression levels were inversely correlated with oocyte maturation in infertile women ($p<0.05$).

Conclusion: These results indicated that the increase in the expression of CCL2 and CXCL8 in the serum and FF can be a biomarker for female infertility that can predict oocyte maturation in ICSI outcomes.

Keywords: ICSI, Follicular fluid, chemokine, Oocyte maturation